

CLAIMS

What is claimed is:

1. A toy water gun of the type for ejecting fluid therefrom, the toy water gun comprising:

a housing;

a reservoir attached to the housing for holding fluid;

a holding area formed by conduits selectively in fluid communication with the reservoir;

a pump for generating a suction force to draw fluid from the reservoir into the holding area when the pump is actuated in a first direction toward a first position and for generating a pressure force to move the fluid from the holding area into an outlet port when the pump is actuated in a second direction toward a second position; and

at least one nozzle in fluid communication with the holding area, the at least one nozzle oriented at an angle with respect to a longitudinal rotational axis of the nozzle, and the at least one nozzle driven rotationally about the longitudinal axis in response to movement of the pump in the second direction.

2. The toy water gun of claim 1, wherein the pump comprises:

piston operable for inducing fluid flow through pressure and suction forces;

a cylinder in fluid communication with the holding area and operable for providing a sealing path for the piston to reciprocate therein;

a first one-way valve for allowing fluid to flow from the reservoir to the holding area when a sufficient pressure differential to open the first valve is generated by the pump; and

a second one-way valve for allowing fluid to flow from the holding area to an outlet port when a sufficient pressure differential to open the second valve is generated by the pump.

3. The toy water gun of claim 2 further comprising:
a slide handle connected to the piston for permitting manual actuation of the pump.
4. The toy water gun of claim 2 further comprising:
a non-rotatable conduit connected to the outlet port on one end and forming a static-to-rotating junction on the other end, the static-to-rotating junction adapted to prevent fluid leakage therefrom; and
a rotatable outlet tube connected between the non-rotatable conduit and the at least one nozzle, placing the nozzle in fluid communication with the non-rotatable conduit.
5. The toy water gun of claim 4 further comprising:
an outlet tube gear attached to the outlet tube adapted to rotationally couple with the pump.
6. The toy water gun of claim 5 further comprising:
a gear train coupled between the pump and the outlet tube operable for converting the reciprocating motion of the pump into rotational motion of the outlet tube.
7. The toy water gun of claim 6, wherein the gear train comprises:
a gear rack attached to the slide handle;
a first gear meshed to and driven by the gear rack;
a second gear coupled to and driven by the first gear;
a third gear meshed to and driven by the second gear; and
a fourth gear meshed to and driven by the third gear, the fourth gear coupled to the output gear for rotatably driving the output tube.
8. The toy water gun of claim 4, wherein the static-to-rotating junction comprises:

a fluid seal engageable with sealing surfaces located on the rotatable outlet tube and the non-rotatable conduit.

9. The toy water gun of claim 1 further comprising:

a ring cam engaging the at least one nozzle whereby the angle of the nozzle with respect to the longitudinal axis decreases when the ring cam moves in a first cam direction and the nozzle angle increases when the ring cam moves in a second cam direction.

10. The toy water gun of claim 9, wherein the ring cam further comprises:

at least one follower pin formed on the ring cam for guiding the ring cam; and

at least one guide rail attached to the ring cam for slidingly engaging the housing and supporting the ring cam through a range of axial locations.

11. The toy water gun of claim 9 further comprising:

a bezel mounted on the housing proximate the nozzle, the bezel operably connected to the ring cam such that the ring cam moves parallel to the longitudinal axis between a first position and a second position in response to rotational movement of the bezel.

12. The toy water gun of claim 11, wherein the bezel further comprises:

a wave groove formed therein for the at least one follower pin to slidingly engage therewith, the wave groove causing the ring cam to reciprocatingly traverse along the longitudinal axis between the first and second positions.

13. The toy water gun of claim 1 further comprising:

an end cap positioned on one end of the housing having at least one radially extending through slot for permitting at least one nozzle to slidingly engage therewith.

14. The toy water gun of claim 1 further comprising:

a shock absorbing member having first and second elements, the elements being operable for rotating together and for slidably moving in an axial direction with respect to one another.

15. The toy water gun of claim 14, wherein the shock absorbing member comprises:

a casing formed by the first and second elements;

a resilient member positioned in the casing adapted to compress when an impact force is transmitted from the nozzle; and

a damping member positioned in the casing adapted to permit movement between the first and second elements and to prevent fluid leakage from the casing.

16. The toy water gun of claim 1, wherein the at least one nozzle is at least partially made of resilient flexible material.

17. The toy water gun of claim 1 further comprising:

a biasing member connected to the at least one nozzle for urging the at least one nozzle radially outward from the longitudinal axis.

18. A toy water gun comprising:

a housing;

a reservoir attached to the housing for holding fluid;

a holding area formed by conduits selectively in fluid communication with the reservoir;

a pump for generating a suction force to draw fluid from the reservoir into the holding area when the pump is actuated in a first direction toward a first position and for generating a pressure force to move the fluid from the holding area into an outlet port when the pump is actuated in a second direction toward a second position; and

at least one nozzle in fluid communication with the holding area, the at least one nozzle oriented at an angle with respect to a longitudinal rotational axis of the nozzle, and the at least one nozzle driven rotationally about the longitudinal axis in response to movement of the pump in the second direction;

a first one-way valve for allowing fluid to flow from the reservoir to the holding area when a sufficient pressure differential to open the first valve is generated by the pump;

a second one-way valve for allowing fluid to flow from the holding area to an outlet port when a sufficient pressure differential to open the second valve is generated by the pump; and

a shock absorbing member coupled to the nozzle, the shock absorbing member adapted to attenuate an impact force transmitted from the at least one nozzle.

19. The toy water gun of claim 18, wherein the pump comprises:
piston operable for inducing fluid flow through pressure and suction forces;
a cylinder in fluid communication with the holding area and operable for providing a sealing path for the piston to reciprocate therein; and
a slide handle connected to the piston for permitting manual actuation of the pump.

20. The toy water gun of claim 18 further comprising:
a non-rotatable conduit connected to the outlet port on one end and forming a static-to-rotating junction on the other end, the static -to-rotating junction adapted to prevent fluid leakage therefrom;
a rotatable outlet tube connected between the non-rotatable conduit and the at least one nozzle, placing the nozzle in fluid communication with the non-rotatable conduit; and
an outlet tube gear attached to the outlet tube adapted to rotationally couple with the pump.

21. The toy water gun of claim 20, wherein the static-to-rotating junction comprises:

a fluid seal engagable with sealing surfaces formed on the rotatable outlet tube and the non-rotatable conduit.

22. The toy water gun of claim 20 further comprising:

a gear train coupled between the pump and the outlet tube operable for converting the reciprocating motion of the pump into rotational motion of the outlet tube.

23. The toy water gun of claim 22, wherein the gear train comprises:

a gear rack attached to the slide handle;

a first gear meshed to and driven by the gear rack;

a second gear coupled to and driven by the first gear;

a third gear meshed to and driven by the second gear; and

a fourth gear meshed to and driven by the third gear, the fourth gear coupled to the output gear for rotatably driving the output tube.

24. The toy water gun of claim 18 further comprising:

an end cap positioned on one end of the housing, the end cap having at least one radially extending through slot for permitting a nozzle to project therethrough, the slot permitting the nozzle angle of orientation to vary between a predetermined range of angles defined relative to the longitudinal axis.

25. The toy water gun of claim 18, wherein the shock absorbing member comprises:

a casing formed by the first and second elements;

a resilient member positioned in the casing adapted to compress when an impact force is transmitted from the nozzle; and

a damping member positioned in the casing adapted to permit movement between the first and second elements and to prevent fluid leakage.

26. The toy water gun of claim 25, wherein the resilient member is a helical spring and the damping member is an O-ring made of flexible fluid impervious material.

27. The toy water gun of claim 18 further comprising:

a ring cam engaging the at least one nozzle whereby the angle of the nozzle with respect to the longitudinal axis decreases when the ring cam moves in a first cam direction and the nozzle angle increases when the ring cam moves in a second cam direction;

at least one follower pin formed on the ring cam for guiding the ring cam; and

at least one guide rail attached to the ring cam for slidingly engaging the housing and supporting the ring cam through a range of axial locations.

28. The toy water gun of claim 27 further comprising:

a bezel operationally connected to the ring cam for reciprocatingly moving the ring cam in response rotational movement of the bezel.

29. The toy water gun of claim 28, wherein the bezel further comprises:

a wave groove formed therein for the at least one follower pin to slidingly engage therewith, the wave groove causing the ring cam to reciprocatingly traverse along the longitudinal axis between the forward and aft positions.

30. The toy water gun of claim 18 further comprising:

a biasing member connected to the at least one nozzle for urging the at least one nozzle radially outward from the longitudinal axis of the housing.

31. A method for ejecting fluid from rotating nozzles of a toy water gun, comprising:

actuating a handle connected to a pump;
converting motion of the pump into rotational motion of the nozzles; and
ejecting fluid from the rotating nozzle.

32. The method of claim 31, wherein the rotating step comprises:
driving at least one gear in response to the pump actuation.

33. The method of claim 31, wherein the actuating step comprises:
manually moving a pump handle connected with the pump for producing a
compression stroke in one direction and a suction stroke in an opposing direction.

34. A method for ejecting fluid from rotating nozzles of a toy water gun,
comprising:
providing nozzles moveable between first and second angles;
providing a nozzle engagement member moveable between first and second
positions;
engaging the nozzles with the engagement member;
moving the nozzles to the first angle when the engagement member moves to the
first position;
moving the nozzles to the second angle when the engagement member moves to
the second position;
providing a pump discharge mechanism for discharging fluid from a reservoir
through the nozzles when actuated; and
providing a drive mechanism causing the nozzles to rotate when the discharge
mechanism is actuated.

35. In a toy water gun for discharging a stream of water through a nozzle, the
water gun having a rotational axis, the improvement comprising:

the nozzle being rotatable relative to the rotational axis and being operative for discharging the stream of water at an angle relative to the axis, the water gun further comprising a manually operable mechanism for rotating the nozzle relative to the axis.

36. The toy water gun of claim 35, further comprising:

a manual pump for pressurizing a chamber and causing water to discharge from the nozzle, the pump coupled to and moveable with the manually operable mechanism.

37. In a toy water gun for discharging a stream of water through at least one nozzle spaced outwardly from a rotational axis, the improvement comprising:

the nozzle being rotatable relative to the rotational axis and being operative for discharging the stream of water, the water gun further comprising a manually operable mechanism for rotating the nozzle relative to the axis.

38. The toy water gun of claim 37, further comprising:

a manual pump for pressurizing a chamber and causing water to discharge from the nozzle, the pump coupled to and moveable with the manually operable mechanism.